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CEMENT COPPER

For many years mining men have known that copper in mine waters will precipitate as metallic copper on any piece of iron placed in the water, while the iron is dissolved. Most of the exceedingly fine particles of metallic copper are usually dislodged from the iron and washed away soon after being precipitated. Therefore the most noticeable feature of the process is disappearance of the iron. Mine track, pipe, pumps, tools, even nails in the miners' shoes might be eaten away in periods of only a few weeks.

About 1860 this destructive chemical activity was turned to advantage by placing pig iron and iron scrap in copper-bearing mine waters and collecting the precipitated copper commonly called "cement copper" by miners. This practice has become common and profitable in mines with appreciable dissolved copper, to supplement regular mine production.

Several cement copper operations are active in California and expansion of this phase of copper mining in the state appears promising. Waters of many of California's inactive copper mines are potential sources of cement copper. It is estimated that 300 to 500 tons of cement copper was produced in California in 1951. Total copper produced in 1951 in California was about 830 short tons.

Formation of cement copper hinges on the relative positions of copper and iron in the Electromotive Force series of elements. This is a list of metals in the order of their natural electromotive activity. A given metal, placed in a solution of another metal below it on the electromotive list, will go into solution causing the previously dissolved metal to precipitate in metallic form. Copper is below zinc and iron in this series, so these metals go into solution while metallic copper is deposited from copper solutions. Lead, on the other hand, is below copper and is not affected in copper solutions.

Iron is used to precipitate cement copper because it is abundant and inexpensive as scrap. Galvanized iron is just as effective as common iron or steel because the zinc coating also replaces copper in solution.

Because of this electromotive activity other materials must be substituted for iron and steel in all equipment used in the cement copper processes. Wooden, concrete, or lead-lined tanks are used. Bronze pumps and fittings, copper-coated nails, copper wire, and plastic rubber, or lead pipe are commonly used.

A REMINDER

If you fail to return the card enclosed in the March issue of MINERAL INFORMATION SERVICE it will be necessary to remove your name from the mailing list. If you have mailed it, thank you for your cooperation.